
NOTES ON *SWARTZIA*
(LEGUMINOSAE:
SWARTZIEAE) PRELIMINARY
TO THE FLORA OF THE
VENEZUELAN GUAYANA¹

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ABSTRACT

Five new species of *Swartzia* (Leguminosae: Swartzieae) recently collected within or at the periphery of the Venezuelan Guayana are described and discussed in terms of relationships and morphology: *S. alato-sericea* Barneby, *S. aymardii* Barneby, *S. oedipus* Barneby, *S. palustris* Barneby, and *S. triptera* Barneby. Figures of *S. oedipus* and *S. triptera* are presented. These descriptions are a prelude to an account of *Swartzia* by R. S. Cowan that will appear in J. A. Steyermark's *Flora of the Venezuelan Guayana*, currently in preparation at the Missouri Botanical Garden.

At the time that Richard S. Cowan, the premier student in this century of the genus *Swartzia*, retired from the Smithsonian Institution and from direct participation in systematic work on neotropical Leguminosae, several collectors were actively exploring the flora of Venezuelan Guayana, and others continue to do so. Cowan saw only a small part of the rich collections of *Swartzia* obtained by the Cerro de la Neblina Expedition (1984–1985), and little or nothing collected subsequently. Many of the more recent collections of *Swartzia* from the Guayana Highland have found their way to the New York Botanical Garden, and incidentally, to the author of this article for identification. With the aid of Cowan's monograph (1967) and supplementary papers, most important of which is his as yet unpublished treatment of the genus for Steyermark's *Flora of the Venezuelan Guayana*, I have been able to name, at least to my own satisfaction, the greater part of this material. It will not surprise anyone familiar with the patterns of narrow endemism in *Swartzia* that along the way I have encountered a number of clearly undescribed taxa. The purpose of this article is to place on record those that have been found in Venezuelan Guayana, and to provide names for use in the forthcoming flora of the region.

Swartzia (sect. et subsect. *Swartzia* ser. *Tounateae*) **alato-sericea** Barneby, sp. nov. TYPE: Brazil. Amazonas: Third Serra da Neblina Expedition, between Tatú and Camp III, 22 Dec.

1965 (fr), Nilo T. Silva & Umbelino Brazão in Maguire 60718 (holotype, INPA; isotypes, K, NY, US).

Proxime ut videtur *S. steyermarkii* Cowan affinis, sed foliolis 6–7 (nec 2–3)-jugis subduplo angustioribus (\pm 2.3–3.3, nec 4–6 cm latis) margine eximie undulatis diversa. A *S. angustifoliola* Schery, quoad foliolorum numerum, ambitum, texturam, colorem necnon marginem undulatam congrua, sed foliolorum rhachi late alata, et a *S. sericea* Vog. distantius rhachi alata et calyce intus glaberrima abstat.

A tree 18 m with trunk 1.5 dm DBH, the young branches and raceme axes densely silky pilosulous with narrowly ascending, basifixed, yellowish hairs, the plurifoliolate leaves except for dorsal side of leaf stalk and pulvinules glabrous, the thinly papyraceous leaflets lustrously olivaceous on upper face, dull pale brown on lower, the racemes arising singly and geminate from annotinous leaf axils. Stipules erect, linear-lanceolate 4–9.5 \times 0.4–0.7 mm, deciduous. Leaf stalks 11.5–19 cm, the interfoliolar segments 1–3 cm, each margined with a herbaceous, finely venulose wing 1.5–2 mm wide, and, at insertion of each pair of leaflets, produced in front of the pulvinules into a deltate, sharply mucronate tip; pulvinules 2–2.5 mm; leaflets 13–15 per leaf, the proximal pairs slightly smaller, the rest subequilong, the blade of all leaflets oblong-elliptic from obtuse, at point of insertion minutely cordate base, contracted into an obtuse acumen \pm 1–1.5 mm, undulate marginally, the larger blades 7.5–10.5 \times 2.3–3.3 cm; midrib canaliculate ven-

¹ Illustrated by Bobbi Angell (NY).

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trally, cariniform dorsally, the numerous and slender secondary nerves widely ascending to anastomosis close within the margin and giving rise to a reticulum of nervules finely prominulous on both faces. Racemes subsessile, 6–14 cm, densely many-flowered; bracts lanceolate 2–2.5 mm, deciduous; pedicels 4.5–6 mm, ebracteolate; calyx sericeous externally, glabrous within, splitting into 4 recurved sepals \pm 4.5 mm; petals, androecium, and young gynoecium unknown, but the gynoecium pubescent (giving rise to a pilosulous pod). Pod declined, the silky pilosulous stipe 2.5–3.5 mm, the body plumply ellipsoid, broadly rounded at each end, \pm 23–27 \times 15 mm, slenderly carinate by the ventral suture, the fleshy valves orange when fresh, atrocastaneous and crumpled when dried, thinly pilosulous overall, dehiscent along both sutures; seeds 2, filling the pod cavity and obliquely truncate where mutually distorted by crowding, the aril \pm 10 mm long, the rugulose testa ochraceous, highly lustrous.

Distribution. In lowland forest on terra firme, known only from the base of Serra da Neblina near 0°40'N, 66°20'W, close to the Venezuelan border in Amazonas, Brazil, and expected in adjacent Territorio Federal Amazonas, Venezuela. Ripe fruits December–January.

Until the flower of *S. alato-sericea* is obtained, it cannot positively be asserted to be apetalous; yet habitual and other characters of foliage and fruit almost certainly attach the species to the apetalous subser. *Tounateae*. In this context the species resembles the widespread *S. sericea* Vog. in habit, form, and number of leaflets, but differs in broadly winged, not terete leaf stalks, and in sepals glabrous on the inner face. Seemingly closer, at least in the winged leaf stalks, is *S. steyermarkii* Cowan, endemic to Venezuelan Guayana, but this differs in leaflets about half as many and twice as wide (as enumerated in the diagnosis). The leaflets of *S. alato-sericea* closely match the shape, number, and undulate leaflet margin of *S. angustifoliola* Schery, a species localized, so far as presently known, on the upper Río Negro in Venezuela; however, *S. angustifoliola* has leaf stalks stipellate at insertion of leaflet pairs and no trace of wing along the stalk between successive pairs.

Swartzia aymardii Barneby, sp. nov. TYPE: Venezuela. Bolívar: Dto. Sifontes, a lo largo de la carretera El Paují–Icabarú, 80 km al SW de Sta. Elena de Uairén, 26 Sep. 1986 (fl), G. Aymard C. 4888 (holotype, PORT).

Swartzia roraimae Sandw. arcte affinis, primo intuitu foliolis dorso praeter costam glaberrimis (nec dense appresse pilosis), ulterius antheris majusculis paucioribus (5, nec 11) ac majoribus (2.5–3, nec 2 mm longis) diversa.

Tree \pm 5 m tall, with terete branchlets, the young stems and all axes of inflorescence densely pilose-tomentulose with matted, grayish or brownish, basifixed hairs, the leathery, strongly bicolored leaflets glabrous except for midrib dorsally strigulose on dorsal face, dark olivaceous and highly lustrous above, paler dull beneath, the few-flowered racemes borne in uppermost leaf axils of hornotinous branchlets. Stipules linear-lanceolate 1.6–3 mm, of firm texture, long persistent. Leaf stalks 2–6 cm, shallowly sulcate ventrally, not wing-marginate, the lower of two interpinnal segments 2.2–3 cm, the distal one shorter (or in lowest leaves absent); leaflets (3–)5, the deeply wrinkled and pilosulous pulvinules 3–4 mm, the blades broadly or narrowly elliptic-acuminate from cuneate base, (4.5–)5–10 \times 1.5–3.5 cm, the lanceolate acumen 7–10 mm; midrib canaliculate above, cariniform beneath, giving rise to narrow, crowded secondary nerves little differentiated in strength and incurved-ascending at \pm 45°, these further generating a close reticulum of veinlets, the whole venation immersed on upper face, bluntly prominulous beneath. Racemes 4–8-flowered, the rachis including short peduncle 6–10 cm; bracts obovate 1.5–2 mm, deciduous; bracteoles 2 at base of pedicel subulate \pm 2–2.5 mm; pedicels at anthesis 9–14 mm, a little widened and ancipital distally; flower buds immediately prior to anthesis globose, densely brownish silky-pilosulous; sepals 4, glabrous internally, 10–11 mm; vexillum (caducous) white, flabellate from short claw, \pm 12 mm, thinly hirsute dorsally, undulate-crispate at margin; androecium glabrous, the anthers of 5 larger stamens 2.5–3 mm, that of many smaller ones 1–1.5 mm, the connective of all muticous; gynoecium glabrous, the gynophore 8–9 mm, the lunately elliptic ovary in profile 8 \times 3 mm, the uncinately recurved style 2.5 mm, obliquely truncate at apex. Fruit unknown.

Distribution. In brush savanna at 750 m, known only from the type locality in the northern foothills of Sierra de Pacaraima in southeastern Bolívar, Venezuela. Flowering September–October.

In foliage and inflorescence *S. aymardii* closely resembles *S. roraimae* Sandw., as yet known only from the southwestern escarpment of Mt. Roraima (in Thurn 67, K = NY Neg. 940), but is different in dorsally glabrous, not densely appressed-pilose

leaflets. Further differences are fewer (5 vs. 11) large anthers 2.5–3 (vs. 2) mm long, and slightly shorter stipules and bracts, characters that will deserve close scrutiny when more collections of each species become available. *Swartzia roraimae* was found by im Thurn at 1,500 m, an elevation unusually high for the genus, and *S. aymardii* at 750 m, suggesting ecological differentiation.

Swartzia (sect. et ser. *Possira*) **oedipus** Barneby, sp. nov. TYPE: Brazil. Amazonas: Mun. Cucuí, in terra firme forest on Rio Xié, 1 hour by motorboat upstream from confluence with Rio Negro (0°58'N, 67°10'W), 25 Oct. 1987 (young fr), D. C. Daly (with P. J. M. Maas, C. F. Sá & R. P. Lima) 5490 (holotype, INPA 150988; isotypes, F, MO, K, NY, US). Figure 1.

Foliorum rachi exalata foliolisque parvis (5 cm usque longis) praeter costam glabris cum *S. foliolosa* Cowan, *S. brachyrrhachide* Harms et *S. longistipitata* Ducke comparabilis, ultimae verisimiliter proxime affinis, a prima foliolis dimidio minoribus necnon pedicellis cum calycis segmentis extus dense sericeis (nec glabris), a secunda et tertia foliolis 4–5(nec 1–3)-jugis, ab omnibus pedicellis calycem versus incrassatis et 2 mm usque crassis diversa.

Trees attaining 20 m with trunk 2 dm DBH, the annotinous and older branchlets ashen glabrate, the hornotinous ones together with terete leaf rachises, petiolules, and dorsal costa of leaflets gray silky-strigulose, the foliage bicolored, the leaflets glossy dark green above, paler dull beneath, the densely brownish sericeous few-flowered racemes axillary to 1–3 distal leaves of each new branchlet, the furthest pseudoterminal, all shorter than the subtending leaf. Stipules linear-attenuate 2.5–5 mm, caducous. Leaf stalks 4–6.5 cm, the petiole proper and the interfoliolar segments 8–13 mm; petiolules 2–2.5 mm, the stipels subobsolete; leaflets 9–11, varying in outline from narrowly ovate- to lance-acuminate from rounded base, including the apically emarginate acumen (5–6 mm) 35–50 × 14–18 mm, the costa shallowly impressed above, cariniform beneath, giving rise to many crowded, incurved-ascending secondary veins and a finer reticulum, all prominulous on both faces of blade. Racemes 3–5-flowered, the axis including short peduncle 3–4 cm; bract and bracteoles at base of each pedicel narrowly triangular 1.5–2 mm, deciduous; pedicels stout, 8–12 mm, clavately thickened upward, at apex ± 2 mm diam.; sepals 8–10 mm, densely silky externally, glabrous within; petal and complete androecium not seen, the anther of shorter stamens ± 0.6 mm, glabrous; ovary glabrous; style subulate, gently incurved, ± 3 mm,

the stigma poriform; stipe of immature fruit 10–14 mm.

Distribution. In lowland, noninundated forest. Known only from the upper Río Negro basin astride the Venezuela–Brazil frontier near Piedra de Cucuy in Territorio Federal Amazonas, Venezuela, and adjacent state of Amazonas, Brazil. Flowering ± September–October.

Additional material examined. VENEZUELA. TERRITORIO FEDERAL AMAZONAS: margen esq. do Río Negro no caminho para Pedra de Cucui (1°15'N, 66°51'W), 28 Oct. 1987 (immature fr), W. A. Rodrigues 10795 (F, GH, K, MO, NY, US).

Swartzia oedipus has the essential characters of section and series *Possira* and falls within the circle of affinity defined by couplets 14–20 in Cowan's (1967: 26) key to that group. Leaflets glabrous beneath except for strigulose costa make it most nearly comparable to *S. foliolosa* Cowan (of southeastern Colombia), to the somewhat polymorphic and widely dispersed *S. brachyrrhachis* Harms, and to *S. longistipitata* Ducke (local in central Brazilian Amazonia), which may be its closest known ally. It differs from *S. foliolosa*, as described by Cowan (1967: 190), in leaflets only half as large and in densely brownish sericeous (vs. glabrous) axes of inflorescence, from *S. brachyrrhachis* in having 8–11 (vs. 1–5) leaflets per leaf, and from *S. longistipitata* by leaflet number (8–11 vs. 3–7 per leaf) and by sepals glabrous (not thinly silky) internally. It differs from all of these in the stout pedicels clavately enlarged upward and about 2 (vs. 1 or <1) mm diam. at apex, the character that suggested the epithet *oedipus*. The small glossy leaflets, the contrast between gray indumentum of stem and leaf stalk and brownish silky indumentum of inflorescence, and the perfectly glabrous, long-stipitate gynoecium are characteristic features.

Swartzia palustris Barneby, sp. nov. TYPE: Venezuela. Territorio Federal Amazonas: hills 2.5 km SW of Base Camp, 400–500 m, SW side of Cerro de la Neblina (00°49'N, 66°10'W), 20 Feb. 1985 (fl, fr), M. Nee 30979 (holotype, VEN; isotype, NY).

Inflorescentia e ramulorum coevorum axillis orta, pedicellis ebracteolatis, styloque laterali brevissimo sect. *Swartziae* subsect. *Swartziae* referenda, serie autem inter *Pittierianis* et *Racemosis* ambigua, cum illa bracteolarum defectu, cum hac foliis unifoliolatis congrua, sed foliolis solitariis inferne aureo-strigosis in utraque serie anomala, affinitatis verae petendae.

Slender trees 3–15 m tall with sometimes sarmentose branches, the annotinous branches gla-

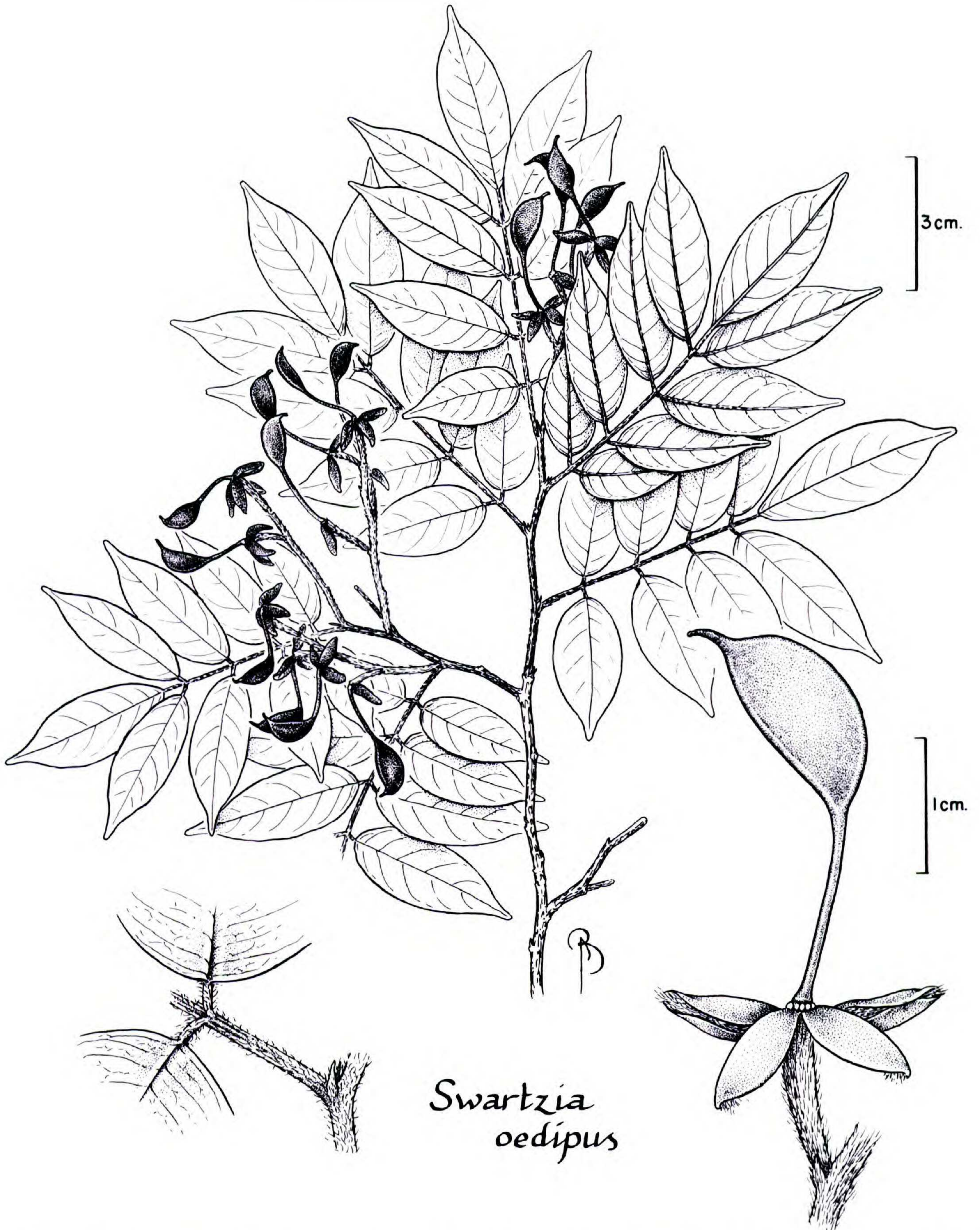


FIGURE 1. *Swartzia oedipus* Barneby. Center, branchlet just after anthesis; lower left, stipule and base of leaf stalk; lower right, gynoecium from branchlet, enlarged. (All from *Daly* 5490.)

brate, the young ones, the lower face of leaflets, and the whole inflorescence densely golden sericeous with contiguous and parallel, forwardly appressed hairs, the leaves unifoliolate, the chartaceous leaflet olivaceous, glabrous, and lustrously

reticulate above, the short racemes arising singly or 2-3 together from hornotinous leaf axils. Stipules (few seen) triangular-subulate, less than 1 mm, fugacious. Leaf stalks terete, including the pulvinus 5-13 mm, at middle 0.7-1 mm diam.; stipels 0;

pulvinule of solitary leaflet 2.5–5 mm; leaflet broadly elliptic from rounded or broadly flabellate base, contracted into a slender, apically emarginate acumen \pm 1–2 cm, the blade including acumen 7.5–15 \times 3.5–8 cm; venation pinnate, the midrib shallowly sulcate ventrally, cariniform dorsally, giving rise on each side to 7–9 major secondary nerves incurved-ascending to anastomosis shortly within the plane margin and to many weaker intercalary ones, these all generating a reticulum of nervules finely prominulous on both faces. Primary axis of racemes 4–12 cm; bracts ovate, scarcely 1 mm; bracteoles 0; pedicels 5–9 mm, a little compressed but not thickened upward; flower buds just prior to anthesis globose, 4–5 mm diam., densely golden sericeous; sepals 4, \pm 4.5 mm, glabrous internally; vexillum \pm 6 mm diam., thinly pilose dorsally, caducous; androecium glabrous, the anther of the \pm 104–114 smaller stamens 0.7–1 mm, that of 3 stout abaxial ones 2.2–2.7 mm, arched backward, apiculate; gynoecium glabrous, the gynophore at anthesis 3–4 mm, the lunate ovary 3–3.5 \times 1.6–1.9 mm, incurved and contracted into an almost obsolete style, the stigma poriform. Pod obliquely oblong- or obovoid-ellipsoid, cuneately contracted into a stipe 4–8 mm, the body in profile (26–)30–34 \times 15–21 mm, the style base becoming infra-apical, the ripe valves orange, when dried crustaceous brittle, dull cinnamon brown; seed solitary, the fimbriate aril \pm 15–17 \times 17–20 mm, the body narrowly reniform \pm 25 \times 9–11 mm, the testa castaneous lustrous.

Distribution. In swampy forest with *Mauritia* and in rainforest on low hills, 130–400 m, known only from the headwaters of ríos Baria–Mawarinuma at 0°50–53'N, 66°10'W, near SW foot of Cerro de la Neblina, Territorio Federal Amazonas, Venezuela. Flowering July, January–March.

Additional specimens examined. VENEZUELA. TERRITORIO FEDERAL AMAZONAS, all from the vicinity of the type locality: 30 Mar. 1984 (fr), *R. Liesner 17035* (MO, NY); 20 Apr. 1984 (fr), *W. W. Thomas 3162* (NY); 8 May 1984 (fr), *W. W. Thomas 3411* (NY); 27 Nov. 1984 (fr + young fl buds), *D. Bell 328* (NY); 27 Jan. 1985 (fl), *M. Nee 30564* (NY); 16 Feb. 1985 (fr), *Boom & Weitzman 5873* (NY).

Swartzia palustris neatly fits Cowan's (1967: 13, 18) definition of sect. *Swartzia* subsect. *Swartzia*, but is not easily assimilated into any series of the subsection. The combination of glabrous gynoecium and absence of bracteoles leads directly to the small group *Pittierianae*, but these have regularly 2–4-jugate, almost glabrous leaves, and consequently a facies very different from *S. palustris*, notable for unifoliolate leaves clothed be-

neath with a dense indumentum of appressed golden hairs. If its lack of bracteoles be disregarded, *S. palustris* would be compatible with the character of series *Racemosae*, where it finds a superficial resemblance in *S. racemosa* Benth. This last differs greatly, however, in very short leaf stalks composed entirely of pulvinus and terminal pulvinule, in lack of golden indumentum, in conspicuous development of stipules, floral bracts and bracteoles, and in almost glabrous (not golden silky) flower buds and a distinctly developed style. The true relationship of *S. palustris* is unknown.

***Swartzia triptera* Barneby, sp. nov.** TYPE: Venezuela. Territorio Federal Amazonas: Depto. Río Negro, in lowland tropical evergreen forest, 140 m, Base Camp on S side of Río Baria (= Mawarinuma), SW side of Cerro de la Neblina, 00°49'30"N, 66°06'20"W, 13 Feb. 1985 (fr), *M. Nee 30839* (holotype, VEN; isotype, NY). Figure 2.

Bracteolarum defectu styloque obliquo brevissimo sect. *Swartziae* subsect. *Swartziae* referenda, foliorum rachi tereti estipellata et gynoecio parcissime puberulo melius cum ser. *Benthamianis* Cowan congrua, sed inter has legumine secus suturas seminiferam late 2- et abaxialem 1-alato (alis 3.5–7 mm latis) insignis.

Trees 4–12 m with smooth fuscous branchlets, glabrous up to the thinly minutely silky strigulose inflorescence, the ample leaflets subconcolorous, dull olivaceous or on lower face dull brown-olivaceous, the racemes of small flowers borne singly or 2–3 together in the axil of coeval leaves. Stipules lacking. Leaf stalks 1–2.9 dm, terete, estipellate; leaflets in all but an occasional depauperate leaf either 5 or 7, the cylindrical black wrinkled pulvinules 6–14 \times 1.1–1.6 mm; leaflets ovate or elliptic-ovate from broadly cuneate or flabellate base, abruptly contracted distally into a caudiform acumen 1–1.5 cm, the blade of lateral ones 10–19 \times (3–)4–6.5 cm, that of the stalked terminal one 13–20 \times (4–)5–9.5 cm; midrib impressed above, cariniform beneath, giving rise to 5–6 pairs of slender major secondary nerves incurved-ascending to anastomosis well within the plane, finely corneous margin, the intervenium of both faces reticulate with a mesh of incised veinlets. Racemes ascending, \pm 10–25-flowered, the axis including peduncle (7–)10–24 cm; bracts subulate 1.5–3 mm, deciduous after anthesis; bracteoles 0; pedicels at anthesis 4–5 mm, in fruit 5–12 mm; flower buds prior to anthesis obnapiform, bluntly pentagonal above middle, thinly puberulent; sepals 5, sharply reflexed, lance-ovate 6–7 mm, glabrous internally; vexillum membranous white glabrous,

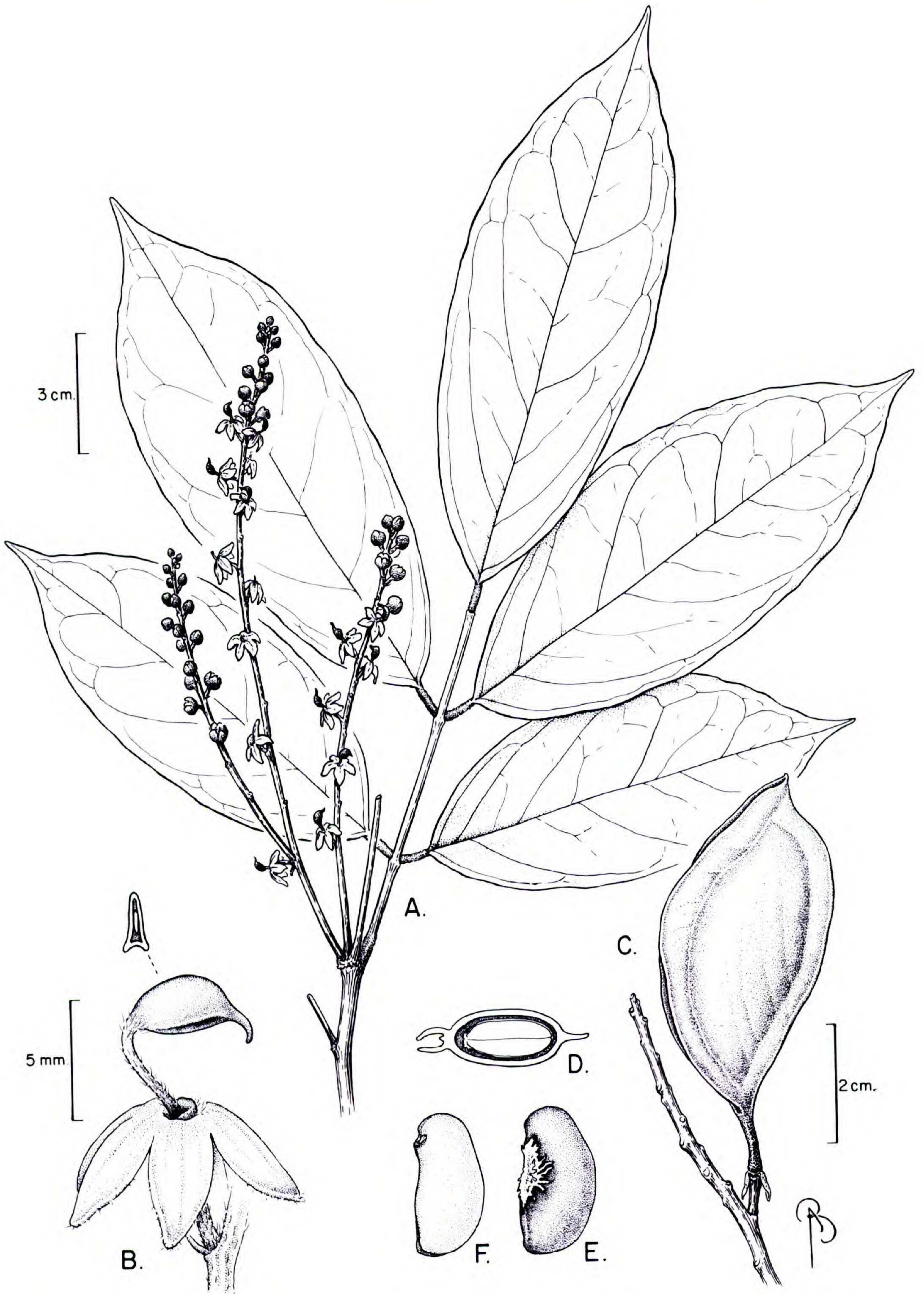


FIGURE 2. *Swartzia triptera* Barneby. —A. Leaf and inflorescence. —B. Calyx and ovary. —C. Pod. —D. Cross section of pod. —E. Seed. —F. Seed testa. (A, B from *Davidse* 27068; C–F from *Nee* 30839.)

caducous with the androecium as the calyx expands, in outline ovate beyond the short claw, $\pm 7 \times 4$ mm; androecium glabrous, the filaments yellow, the ± 70 small anthers 0.6–0.7 mm diam., the 4 large ones 1.5 mm; gynophore 2.5–2.8 mm, puberulent; ovary ± 3 mm, glabrous except for a few hairs at base and along sutures; style obliquely terminal ± 1 mm, incurved, the stigma punctiform. Pod ascending, stipitate, the stipe 7–11 mm, the body in profile asymmetrically elliptic $5.5\text{--}8 \times 2.7\text{--}3$ cm, cuneately attenuate at base, more abruptly contracted at apex into a short triangular beak, laterally compressed but turgid over the 2 seeds, girdled lengthwise by wings 3.5–7 mm wide arising 2 from the adaxial and one from the abaxial suture, the stiffly leathery valves glabrous, vertically shallow-grooved over the convex fertile seed chamber, this in transverse section $\pm 18\text{--}20 \times 9\text{--}10$ mm; exocarp smooth papery fuscous, the endocarp crustaceous 0.6 mm thick; seeds $\pm 20 \times 11 \times 10$ mm, the fimbriate aril 4–5 mm diam., the fragile papery testa lustrously castaneous.

Distribution. In terra firme forest at ± 140 m, known only from the SW base of Cerro de la Neblina in Territorio Federal Amazonas, Venezuela. Flowering July–August; fruits ripe November–February.

Additional specimens examined. All from the immediate vicinity of Cerro de la Neblina Base Camp on Río Mawarinuma: 6–7 July 1984 (fl), G. Davidse & J. S. Miller 27068 (NY); 6 July 1984 (in bud), J. S. Miller 1735 (NY); 27 Nov. 1984 (fr), Boom & Weitzman 5165 (NY); 1 Feb. 1985 (fr), Boom & Weitzman 5476; 7 Feb. 1985 (sterile), Boom & Weitzman 5660.

By virtue of habit, terete estipellate leaf stalks, absence of bracteoles, and almost glabrous gynoe-cium with very short incurved style, *S. triptera* appears related to ser. *Benthamianae* Cowan of subsect. *Swartzia*, where it closely resembles, when flowering or sterile, *S. benthamiana* Miquel and *S. laevicarpa* Amshoff. The fruit is nearly that of the latter as to size and outline, but unlike that of any described species of the genus is doubly winged along the ventral and singly so along the dorsal suture. The ripe fruit is strangely similar in structure to that of the African *Erythrina greenwayi* Verdcourt and has no precedent in *Swartzia*.

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